WEDNESDAY, OCTOBER 29TH, 1879.

The Vice-President, W. J. Stephens Esq., M.A., in the Chair.

DONATIONS.

From Baron F. von Mueller, K.C.M.G, "Eucalyptographia," decade 3, Melbourne, 1879.

From Dr. Julius von Haast, Geology of the Provinces of Canterbury and Westland, Christchurch, 1879.

Journal of the Royal Microscopical Society, Vol. 2, No. 5, London, 1879.

Mitthielungen aus der Zoologischen Station zu Neapel, Leipzig, 1879.

Zweiter Nachtrag zum Bibliothekskatalog der Zooligischen Station zu Neapel, Leipzig, 1879.

Report of the South Australian Institute, for 1878.

Archives Neerlandaises der Sciences Exactes et Naturelles, Haarlem, 1879, Tome 14, parts 1 and 2.

Journal of Conchology, London, July, 1879.

PAPERS READ.

On the Mugilidæ of Australia.

By William Macleay, F.L.S., &c.

Some months ago I read a Paper before this Society on the *Clupeidæ* of Australia, and I endeavoured in that communication to direct public attention to the great value of our undeveloped fisheries.

It is chiefly with the same object that I have now endeavoured to bring together all the knowledge we possess of the *Mugilidæ* of Australia, a family of Fishes which is well represented on our

Eastern sea-board. The *Mugilidæ* are Acanthopteryginous Fishes of oblong form, with large scales, no lateral line, dentition feeble or none, two short dorsal fins, and the ventral fins abdominal. They are inhabitants of both fresh and salt water, some species almost exclusively the former, while others seem as exclusively to keep to the latter. It may be confidently said of nearly all of them however, that like the Salmon they take to the sea at certain seasons, unless accidently shut up in the rivers or lakes, and it is equally certain that at the spawning season they enter the harbours and estuaries of the coast in immense shoals, and push up the rivers and creeks to deposit their spawn. The period of their arrival in search of spawning grounds varies considerably, in each species, and to a certain extent in the individuals of the same species, but it is always at the commencement of the cold season here, (from the end of March to May,) and I believe I have good grounds for saying (as will be shown hereafter), that the ova do not germinate until the month of October.

The period at which the young Mullet leaves the rivers and mud-flats is not so easily determined, and I suspect that the analogy to the Salmon breaks down here. The fishermen to whom I have spoken on the subject, all declare that the movement of the shoals at the spawning season is simply out of one estuary into another, and that they are not, and never are, deep-sea Fishes. What makes this (the fishermen's view) the more likely is that at that season the Mullet is extremely fat, and it is scarcely possible that a fish which lives as Dr. Gunther informs us on the organic substances contained in the mud of rivers and creeks, sifted from the inorganic particles by the action of a pharyngeal apparatus, can improve so rapidly in condition in the open sea and a sandy or rocky bottom. I shall however have more to say on this subject, when I come to the description and history of the various species.

Dr. Gunther (Cat. Brit. Mus., Vol. III., p. 409.) divides the family into three genera :

Mugil—without teeth in the jaws.
Agonostoma—small teeth, lower jaw rounded.
Myxus—small teeth, lower jaw angular.

To these, Kner, in the Fishes of the Novara, page 276, has added the genus *Pseudomugil*, founded on a small fish of Port Jackson, which I have never seen, but it is certainly not properly one of the *Mugilidæ*, and I shall not therefore include it in the family.

MUGIL, Artedi.

This is the chief genus of the family, it is of world-wide distribution, of numerous species, and of high reputation as a food fish.

The following are the Australian species :—

A. Adipose eyelid, lips thin.

Mugil grandis, Casteln.

Proceedings of the Linn. Soc. of N. S. W., Vol. 3, p. 386.

The description given of this species by the Count de Castelnau is so complete and elaborate that I can offer very little in addition. The male is proportionally shorter than the female, and most remarkably so about the snout.

This is the well-known "*Sea Mullet*" of the fishermen, the largest and best of the species found on our Eastern Coasts. It visits our harbours and inlets every year in enormous successive shoals, at periods varying from the middle of March to the latter end of May. These shoals always appear to be proceeding in a northerly direction, but we have no evidence that they come from deep-water, or that they are ever seen excepting close to the shore. At the season of their appearance in these large shoals, they are full of roe and in the finest condition, indeed I think that in richness and delicacy of flavour a good Sea Mullet surpasses even the Salmon.

When "*the Mullet are in*" to use the expression of those who are on the watch for them, considerable activity is shown among the fishermen, but the benefit they derive from the bountiful profusion of these visitors is so limited, that I have known boat-loads of the finest fish thrown away, because they were not worth the trouble of conveying to market. Beyond the consumption of the fresh fish in the city, no means have yet been devised for utilizing this great food supply. The roes no doubt are eagerly bought up and salted, and a few of the fish themselves are salted and smoked, but the salting process is I think anything but a success.

The object of these migrations being the search for spawning grounds, the shoals after entering the harbour at once seem to search every creek and cranny for the suitable conditions. In this harbour no doubt the mud flats up the Parramatta River are the favourite spots for the deposition of the spawn, but the following note which I made a few days ago, would seem to indicate that almost any muddy beach will suit their purpose.

"On the 16th of October, 1879, large shoals of very small fish were seen alongside the boat jetty at Elizabeth Bay. Two of them were captured in a butterfly net by Mr. Masters. They proved to be the young of *Mugil grandis*, and were respectively 16 and 18 lines in length. As the time of spawning is never later than May, and as these fish could not have been more than a day or two old, the inference is that the spawn had remained in the mud near that spot during the winter, and until the increasing heat of spring had caused the ova to germinate."

Among the many and prolific breeding grounds of this Mullet, there is none more important than George's River, and if no other objections existed to the proposal of damming that river for the purpose of providing Sydney with water, the closing up of such an extent of the favourite spawning ground of this most valuable fish, would of itself, be a sufficient ground of objection.

This species of Mullet, as indeed is the case with all fishes, loses very rapidly its excellence after the spawning season is over, they are indeed still fat, but the delicacy and freshness are gone, and they quickly contract an oily and muddy taste. In this state they are often brought to the market throughout the winter, but they are not to be compared with the same fish when it first comes in to spawn; in fact they are then as disagreeable as they were formerly delicious. The date at which these fish return to the sea, if they do so at all, is very doubtful, the favourite theory has been that in this respect they resemble the Salmon, but as I mentioned a few pages back, the evidence of the fishermen generally points to a very different conclusion, and the feeding habits of the Mullet are such as to strengthen the evidence in favour of their views. The Mullets generally, according to their observation, accumulate at the spawning season in large shoals from the rivers, creeks, mud flats, and lakes in which they had lain during the winter and early part of summer. Acting upon the impulse which seems to compel movement at that time, the shoals descend to the sea, but apparently merely for the purpose of changing their ground, as they enter and run up the next river or inlet in their course. Thus the full fish from Botany and George's River enter Port Jackson and so on; the movement always being from South to North, and I have never heard of anything resembling a return current of the spent fish. There should be no great difficulty, one would suppose, with a fish so well-known and such a regular visitant as the *Mugil grandis* in arriving at something like accuracy as regards its history and habits.

2. Mugil dobula, Gunth.

Cat. Brit. Mus., Vol. III., p. 420. Casteln., P. L. S., N.S. Wales III, p. 387.

The following is Dr. Gunther's description:

"D. 4. 1/8. A. 3/8. L. lat. 40—42. L. transv. 14.

"The height of the body equals the length of the head and is one-fifth of the total. The young specimen has the body somewhat more slender. The least depth of the tail is two-fifths of the length of the head. The lower profile of the head is rather more convex than the upper; the greatest depth of the head, above the posterior margin of the operculum, is three quarters of its length; the interorbital space is slightly convex, and contained twice and a third in the length of the head. The snout is broad, moderately depressed, and longer than the eye; lips thin; the maxillary is a little longer than the intermaxillary, and becomes just visible behind the angle of the mouth; the preorbital is not emarginate and is minutely denticulated at its anterior edge and at its extremity, which is obliquely truncated. The cleft of the mouth is one-fourth broader than it is deep; the margins of the mandibulary bones form an acute angle anteriorly; the space at the chin, between the mandibles and interopercles, is elongate-lanceolate. Both lips are provided with a series of minute ciliæ. There is a deep cavity in front of the vomer. The nostrils are distant from each other, and the posterior is somewhat nearer to the orbit than to the anterior. The eye is surrounded by a broad adipose membrane, nearly entirely covering the iris. There are three series of somewhat deciduous scales between the eye and the præopercular margin; the angle of the præoperculum is rather produced posteriorly; there are three pores on its inferior margin and two on its posterior. The pectoral fin is inserted somewhat above the middle of the body, and extends to the tenth scale of the lateral line; it is shorter than the head (the snout not included); the root of the ventral is midway between the base of the pectoral and dorsal. There are 22 or 24 scales between the snout and the spinous dorsal. The origin of the latter corresponds to the twelfth scale of the lateral line, and is exactly in the middle between snout and base of the caudal; the length of the first spine is one half, or a little more than one half, of that of the head. The distance between the origins of the two dorsal fins is

nearly equal to the length of the head. The soft dorsal is considerably higher than long, as high as the spinous, and has the upper edge slightly emarginate; a few scales cover the anterior rays. Caudal forked. The anal commences a litttle before the opposite dorsal fin, is higher than long, and rather higher and not more scaly, than the dorsal. Pointed scales of moderate length in the axil of the first dorsal, of the pectoral, and of the ventral. Colour greenish shining golden; fins minutely dotted with blackish."

Dr. Gunther mentions specimens of this fish in the British Museum from Australia, and Aneiteum, and Count Castelnau points out its indentity with the well-known "*Hard-gut Mullet*" of the Sydney fisherman.

It is a much smaller fish than *M. grandis*, but equally good, and equally abundant in the spawning season. The shoals generally make their appearance before those of *M. grandis*, and penetrate higher up the rivers into fresh water.

3. Mugil cephalotus, C. & V.

(Translated from the German of Prof. Kner, "Voyage of the Novara," page 224.)

The height of the body is 5—5⅓ in the total length, and nearly equal to the length of the head, in which the width of the forehead between the eyes is contained 2½ times; the adipose eyelid strongly developed, anteriorly and posteriorly; the upper lip thin; the edge of the inner and sub-maxillæ thickly beset with ciliæ, these last rectangular at the junction, and larger; the palate has on either side two longish patches of very fine velvety teeth, and the tongue is rough; præorbital is long, and is thickly dentated on its under and hinder edge. The angle of the præoperculum springs close behind with a blunted point. The first dorsal begins exactly in the centre of the length of the body, and the ventrals are in the middle between it and the base of the pectorals. The large scales of the top of the head are deeply

concentrically striated, those of the trunk more regularly ctenoid. The spur scale of the dorsal reaches beyond the end of the fin, that of the pectorals measures two-fifths of the length of the fin. All examples show a large bluish warty spot at the base of the pectorals, and many alternate clear and clouded stripes along the scale rows. Length 3—11″. From Java, Manilla, and New Holland.

D. 4. 1/8. A. 3/8. L. lat. 39-40.

I have never seen this fish, but Kner, who is an accurate observer and an acknowledged authority, announces it as a Port Jackson fish in his work on the Fishes of the Novara Expedition, and there is no reason to suppose that he is wrong. We may conclude however that it is not a common fish, and therefore cannot be reckoned among the useful species.

4. Mugil argenteus, Gunth.

Cat. Brit. Mus. III, p. 424, Journ. Mus. Godef.

D. 4. 1/8. A. 3/9. L. lat. 28. L. transv. 10.

"The height of the body is contained four-times in the total length, the length of the head four-times and two-thirds, the caudal fin nearly five-times. An adipose membrane covers one-half of the iris anteriorly and posteriorly. The upper profile is strongly arched. The interorbital space is flat, and its width is two-fifths or the length of the head. The snout is rather broad, shorter than the eye, the upper lip being moderately thick, truncated, and forming its front margin. The anterior margins of the two mandibulary bones form an obtuse angle, and the cleft of the mouth is thrice as broad as it is deep. The free space at the chin, between the mandibles is narrow, elongate, lanceolate; the maxillary is entirely hidden; the præorbital with a notch anteriorly, and with the extremity truncated. There are eighteen scales between the snout and the dorsal. The pectoral is as long as the head, the length of the snout not included, and extends

to the ninth scale of the lateral line; it is inserted somewhat above the middle of the depth of the body, and has no elongate scale in its axil. The spinous dorsal commences nearer to the tail than to the extremity of the snout above the tenth scale of the lateral line. The second dorsal commences above the twentieth scale, or above the middle of the anal fin; both fins are scaleless. Dorsal and anal fins of equal height, much lower than the tail between them; caudal emarginate, black-edged."

Dr. Gunther gives, in his Catalogue, from which the above description is copied, Port Jackson and South Australia as the habitat of this species, but in a subsequent mention of the same fish in his work on the Fishes of the South Sea, published in the Journal of the Godeffrey Museum, he mentions, the Fitzroy River near Rockhampton, as another locality. I have never, to my knowledge, seen a specimen of the fish.

5. Mugil occidentalis, Casteln.

Proc. Zool. and Acclim. Soc., Victoria, Vol. II., p. 135.

D. 4. 1/3. A. 3/8. L. lat. 44.

The following is Count Castelnau's description of this fish. It is quite unknown to me:

"General appearance of *Mugil Waigiensis* and the head of the same form; height of the body contained four times in the total length of the fish to the centre of the tail; head not quite as long as the height of the body, contained nearly four and a-half times in the same dimension; snout longer than the diameter of the eye, but contained nearly four times in the length of the head; the breadth of this, behind the eyes, is contained once and a-half in the length of the head and the space between the eyes is contained a little more than twice in the same dimension; the teeth are very numerous and rather large for the genus, on both of the jaws; the space extending behind the eye and also the adipose eyelid are covered with strong and numerous arched striæ;

the head is covered with scales of large size, but these become very minute towards the lips; the longitudinal line has forty large scales, and three or four smaller ones near the caudal. From the transverse line that would pass over the centre of the eye to the root of the dorsal there are twenty scales; the body is very high, and its lower profile very convexed; the scales number fifteen on the transverse line; they are plain, rather rugose, with a short ridge that does not extend to the root, neither to the margin; the first dorsal is placed at equal distance from the extremity of the snout and the upper base of the caudal fin; it is formed of four spines; the first of which is the longest, and is equal to the space between the eyes; the second dorsal is placed behind the root of the first at a distance rather less than the length of the head; it is formed of a spine and eight rays; the first is not longer, of one half of the height of the first ray; the last is prolongated and pointed; there are a few very minute scales between the rays; the caudal is strongly forked; it is scaly and formed of fourteen long rays; the anal is opposite to the second dorsal, and has the same form; it has three spines and eight rays; the ventrals are inserted at equal distance from the base of the pectorals and the first dorsal; the pectorals are short, broad and scaly; their length is contained one and a-half in the head; they are very far from attaining the vertical from the first dorsal, and their extremity only covers the base of the tenth scale of the longitudinal line; they have fifteen rays. The eleventh and twenty-third transverse lines of scales originate at the root of the first and second dorsal; there is a very large pectoral scale.

The fish seems to have been silvery with the upper parts of an obscured grey; the longitudinal lines are well marked on the specimens preserved in liquor; there is a large golden blotch behind the eye; the length of my specimens, which are said by Mr. Bostock to be of the average size, are about twelve inches; but a dried one he also sent me is fourteen. This sort inhabits

the rivers of Western Australia, all the year round, and is a good edible fish."

B. No adipose eyelid.

6. Mugil Waigiensis, Quoy and Gaim.

Gunth. Cat. Brit. Mus., Vol III., p. 435.

D. 4. 1/7. A. 3/8. L. lat. 26—27. L. transv. 9. Cæc. pylor. 10. Vert. 11/13.

The height of the body is contained four-time and a-fourth to four-times and three-fourths in the total length, the length of the head four-times and a-half. Head broad, flat above, the width of the interorbital space being one-half of the length of the head. Snout short, broad, depressed and obtuse. Lips thin, the angle made by the anterior margins of the mandibulary bones is very obtuse. The free space at the chin, between the mandibles, is broadly lanceolate. The inferior extremity of the maxillary is visible below the angle of the mouth. Eye without adipose membrane. There are sixteen series of scales between the spinous dorsal fin and the snout. The pectoral extends to the vertical from the orign of the dorsal. The eight and seventeenth scales of the lateral line correspond to the origins of the two dorsal fins. The soft dorsal and the anal short and elevated, scaly; caudal very slightly emarginate. Pectorals blackish, entirely black in immature specimens."—*(Gunther.)*

"From the Red Sea through the Indian Ocean and Archipelago to the Coasts of Australia and to Polynesia," says Dr. Gunther, to these localities Count Castelnau adds Port Jackson. It must however, I think, be rather a rare visitant to the temperate regions of New South Wales, but it is abundant in the Northern parts of Australia at certain seasons, and is most deservedly looked upon as the perfection of piscine excellence.

I have received specimens from Port Darwin and I found them most abundant at Cape York in the month of July 1875.

7. Mugil Peronii, Cuv. and Val.

Gunth. Cat. Brit. Mus., Vol. III., p. 452. Casteln. Proc. Linn. Soc., N.S. Wales, Vol. III., p.

D. 4. 1/9. A. 3/10. L. lat. 41. Cæc. pylor. 2.

Upper profile straight, snout longer than the eye, maxillary not entirely hidden by the præorbital; no adipose eyelid, no pointed scale in pectoral axil, caudal compressed, very high and very strongly emarginate; body compressed, its greatest height being behind the centre. Colour very silvery; back black, with a blue tinge, fins dark, a bright golden spot on the opercle in front of the pectorals, and another behind the eye.

This species was originally described by Valenciennes as coming from the North West Coast of New Holland. This would appear to be a mistake. Count Castelnau points out in the Proc. Zool. and Acclim. Soc., of Victoria, Vol. II., p. 151, that the locality from which the specimen named *Peronii* by Valenciennes came, was Western Port in Victoria. It is not however found in great numbers in that colony. In Port Jackson it is known as the *Flat-tail Mullet*. Like *M. grandis* and *dobula*, it is very plentiful at spawning time, which I am told is rather later than that of the others. It is a very fine fish, averaging about a foot in length. The broad high tail, and the eye without adipose lid, make this species readily recognizable from any of the others found in Port Jackson

8. Mugil compressus, Gunth.

Cat. Brit. Mus., Vol., III., p. 451.

D. 4. 1/8. A. 3/9. L. lat. 28. L. transv. 10.

"Adipose eyelid none; upper lip rather thin; the greatest depth of the body is below the spinous dorsal, where it is contained four-times and two-thirds in the total length. The extremity of the maxillary is conspicuous behind and below the angle of the

mouth. The two anterior dorsal spines of nearly equal length and strength."

Of this fish Dr. Gunther only says, "Habitat, New South Wales; a specimen one foot long, presented by the Medical Officers R. A." I have never seen anything like it from any part of New South Wales, but I have identified a Mullet I received some months ago from Port Darwin as this species.

9. Mugil Pettardi, Casteln.

Researches on the Fishes of Australia, p. 32.

D. 4. 1/8. A. 3/9. L. lat. 46.

"No adipose eyelid, snout tapering, height of body four-times in the total length, and more than the length of the head. Anterior dorsal spines very strong. Caudal fin very large, with the lobes elongate." Named by Count Castelnau after Mr. Pettard who sent him the first specimens he received. It seems to be abundant in the Richmond River, and attains a considerable size (about a foot). Like all the tribe it is much prized for the table.

10. Mugil delicatus, All. and MacL.

Proc. Linn. Soc., N. S. Wales, Vol. 1, p. 341, pl. xv., fig. 1.

By reference to the volume indicated, a full description and figure of this fine fish will be obtained. It was caught in the seine in great abundance about the end of June, 1875, in the Bays about Cape York, along with *M. Waigiensis*, by the crew of the "Chevert." The fishes were then without roe, but probably had only just deposited it, as they were in very fine condition. The scanty inhabitants of Somerset. among whom some of the hauls were distributed, were no less pleased than surprised to find themselves surrounded by such delicacies; though living almost among them, they had never noticed the fish before.

I now come to two species placed by their respective authors in the genus *Mugil*, but which appear to me to differ considerably in appearance from all others of the genus, though possibly they would not fit well into the following genus *Agonostoma*. One of them is thus described by Count Castelnau:

11. Mugil ventricosus, Casteln.

Researches on the Fishes of Australia, p. 32.

"Adipose eyelid not developed; upper lip not particularly thick; anal fin with eight soft rays, lateral line with twenty-nine scales. These characters would only allow this species to be placed with *Waigiensis*, but it is very distinct by its form, &c. Height of the body contained rather less than three times and a-half in the total length of the fish; the head is three times and a-quarter in the same; the general form of the body is oval and compressed; the upper profile regularly curved, and the lower one inflated on the belly; head broad, rather flat above; the interorbital space is contained twice and a-half in the length of the head; this is rather pointed, seen laterally the angle made by the anterior margins of the mandibulary bones is very obtuse and emarginated in front; mandibules finely striated; the free space at the chin broadly lanceolate; teeth very visible and numerous at the upper jaw, the lower one rather crenulated on its edge; eye rather large contained three times and a-half in the length of the head; the anterior dorsal spine is large, and only contained once and a-half in the length of the head; the pectorals are contained once and one-third in the same, and are inserted above the middle of the depth of the body; the ventrals are situated much nearer to the perpendicular of the base of the pectorals than to the one of the first dorsal; the anal commences a little in advance of the opposite dorsal fin, and both are scaly; the least depth of the tail is contained twice and a-half in the length of the head, or twice and two-thirds in the thickest part of the body; the colour after having been in the liquor, is uniform silvery, with the upper part

bluish; the fins yellow. Two specimens about three and a-half inches long. Nicol Bay, Western Australia.

Nota.—The position of the teeth would place this fish with *Agonostoma*, but it is so absolutely similar to some species of *Mugil* as to make me unwilling to put it in any other genus, the more so as the cleft of the mouth agrees with *Mugil*, and not with *Agonostoma*. I doubt very much also if this latter genus will be maintained, as I think other sorts will form passages between the two."

12. Mugil crenidens, Kner.

Voy. Nov. Fische, p. 229, pl. 9, fig. 6.

D. 4. 1/8. A. 3/9. L. lat. 43—44. L. trans. 12—13. Ap. pyl. 2.

"Dentes crenati uniseriales intermaxillares, ciliati pluriseriales in ambitu maxillæ inferioris, vomer, os palatina, pterygoidea et linguale dentibus velutinis obsita."

I will not give any further detail of this species, as it can scarcely be confounded with any other, it is a small fish not 6 inches in length, and is rather rare I should say in Port Jackson.

Two other species of *Mugil* have been described as coming from this country, one *Mugil breviceps*, by Steindackner in the Proceedings of the Academy of Sciences of Vienna in 1866, the other *Mugil gelatinosus* by Klunzinger in the Archiv. fur Natur, for 1872. I have never seen these descriptions, and I cannot recognize or accept them as species. If Naturalists are desirous of describing the Fauna of this country in publications in places so remote as Vienna or Berlin, they might at all events transmit a copy of such publications to one of the scientific societies of this place.

Genus AGONOSTOMA, Gunther.

Small teeth in one at least of the jaws, the lower lip with the margin rounded not sharp.

13. AGONOSTOMA DIEMENSIS, Richardson.

Erebus and Terror, Fishes, p. 37, pl. 26, fig. 1 and 2. Casteln., Proc. Zool. and Accl. Soc., Victoria, Vol. 1, p. 161.

D. 4/10. A. 3/12. C. 14. 5/4. P. 15.

Upper parts greyish-blue with green tinges on the body, and brown on the head; the lower parts of the body are silvery, the upper and pectoral fins are light grey, the caudal is yellow bordered posteriorly with black, the anal white; there are very fine longitudinal lines on the sides; eyes gilt. Count Castelnau states "*loc. cit.*" that this fish is very common at Port Phillip all the year round, that it is called the "*Mullet*" there, and that it rarely exceeds 12 or 13 inches in length. He points out also that Dr. Gunther had made a mistake in referring this species to *Agonostoma Forsteri*, a distinct New Zealand fish. This species is also common in Western Australia.

14. AGONOSTOMA LACUSTRIS, Casteln.

Proc. Zool. and Acclim. Soc., Victoria, Vol. 1, p. 142.

D. 4/9. A. 3/12. L. lat. 62. L. transv. 16.

Head not so pointed as in the last species; height five and a-half times in the total length, head five times in the same; orbit four and a-half times in the length of the head. The two first spines of the dorsal are joined at the base; the caudal is strongly emarginate with the lobes pointed. Colour greyish-green on the upper parts, white on the lower; each scale with an obscure margin, a reddish spot on the head; the upper part of the head and lips of a dark violet colour; fins greyish, caudal with a black posterior margin, eyes of a very bright orange.

This fish is known as the *Lake Mullet*, and is brought to the Melbourne market from the Gipps Land Lakes. It is scarce.

In my paper on the fishes of Port Darwin, (Proc. Linn. Soc., Vol. 2, p. 360, pl. ix., fig. 8.) I described a fish under the name of *Agonostoma Darwiniense*. It is an *Eleotris* and not an *Agonostoma*.

Genus MYXUS, Gunth.

Small teeth in the upper jaw, sometimes also on the lower, anterior margin of the mandibles sharp.

15. Myxus elongatus, Gunth.

Cat. Brit. Mus., Vol. III., p. 466. Kner., Voy. Novara, p. 230.

D. 4. 1/8. A. 3/9. L. lat. 45. L. transv. 13.

"A single series of fine teeth in the upper jaw, none in the lower; vomer with a narrow cross band of teeth; sometimes a very small patch anteriorly on the palatine bones. Lips thin; præorbital serrated anteriorly and inferiorly. The anterior dorsal spine slender, its length being rather more than one-half of that of the head. Eleven inches long."

Hab. Hobson's Bay and Port Jackson.

To the above description of Dr. Gunther's I may add that the small specimens I have seen taken in Port Jackson, have a distinct black spot above the root of the pectoral fins, and a golden spot near them on the edge of the operculum. They are known among the Sydney fishermen as the "Sand Mullet" and "Tallegallann," and are not of much value as an article of food.

From the list of species of the Mullet tribe above enumerated, it will be seen that while all parts of Australia abound with one or more species of these very valuable fishes, Port Jackson and its immediate vicinity is favoured by the annual visits of no less than three of the very best kinds:—"*M. grandis*, *dobula*, and *Peronii*." But of what avail is it? We certainly do not manifest any appreciation of our advantages, by our efforts to benefit by them. In the magnificent display of all the productions and manufactures of the Globe, now to be seen in the International Exhibition in the Garden Palace, one looks in vain for any evidence of the value of our Fisheries. We see Tunny, Sardines and Anchovies from the Mediterranean, Salmon from America, and Cod, Ling, Herring, &c, from Northern Europe, but in Australia

with a more bountiful natural supply than any, or all of these countries, there is not a single exhibit of fish of any kind. It is no doubt overstepping the bounds of a Scientific Paper, entering at any length into questions of an economic character, but if by means of the publicity given to the papers read in this Society, I am enabled to call public attention to this all important subject, I am sure the Society will not grudge me the opportunity.

I do not propose, however, to do more than point out that the development of our fisheries is of such vast importance in a national point of view, that it might well, here, as has been the case in nearly all other countries, form a subject for the serious attention of the Government. I do not mean that the Government should become fishermen or fishmongers, but that it should use the means, readily at its disposal, to bring together all information, which we are now so defective in, as to the haunts, habits, uses, &c., of the fishes of our Coast. For this purpose, I think a Commission should be appointed, whose duty it would be to enquire into, and report upon everything connected with our fish supply, on fish culture, on the methods to be employed in catching the various fishes, on the best modes of preparing them for the market, and on the best means of protecting valuable kinds from unprofitable destruction, either by their human or their natural enemies. Such an enquiry properly conducted, would necessarily be productive of much good in accumulating information of a reliable character upon subjects admittedly of National importance even though the results on the development of our fisheries might not be immediately apparent.